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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,409	09/19/2003	Johan M. Gunther	5200	7452
7590	11/29/2005			
Donald D. Mon 750 East Green Street #303 Pasadena, CA 91101			EXAMINER SPAHN, GAY	
			ART UNIT 3673	PAPER NUMBER

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/666,409	GUNTHER, JOHAN M.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Gay Ann Spahn	3673	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 September 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 4-7, 9, 15-19 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 8, 10-13, 20-24, 26, 27, 28, and 29 is/are rejected.
- 7) ☐ Claim(s) 8 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of the species of Figs. 3 and 4 in the reply filed on 08 September 2005 is acknowledged.

In his election, Applicant listed claims 1, 10, and 20 as being generic and claims 2, 3, 8, and 9 as specifically reading on the species of elected Figures 3 and 4. The examiner agrees that claims 1, 10, and 20 are generic along with claims 11-13 and claims 21-24, 26, 27, 28, and 29 and will therefore, be examined.

However, the examiner disagrees that claim 9 reads of the species of elected Figures 3 and 4 since claim 9 recites "a pair of said binder injectors and at least one of said water injectors are set in said shaft, with said water injectors located axially between said binder injectors" and Figures 3 and 4 do not show a pair of binder injectors set in said shaft and located axially between said water injectors.

Further, the examiner believes that claims 14-19 are not generic and that claim 14 does read on the species of elected Figures 3-4, but that claims 15-19 do not read of the species of elected Figures 3-4. The examiner also believes that claim 25 is not generic and does not read on the species of elected Figures 3-4.

Therefore, claims 4-7, 9, 15-19, and 25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

### ***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because:

(1) reference character "41" has been used to designate both "pump" (see page 18, line 12 and Fig. 1) and "mixed stream" (page 19, line 14 and Fig. 5);

(2) reference character "42" has been used to designate all of a "conduit" (see page 18, line 12 and Figs. 1 and 8), a "deflector" (page 20, line 23 and Fig. 5), and a "water supply pipe" (page 22, line 5); and

(3) reference character "43" has been used to designate both "water control valve" (see page 18, line 13-14 and Fig. 8) and "deflector" (page 20, line 23 and Fig. 5).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

The examiner notes that Applicant's typewriter or computer appears to be dropping certain letters such as "e", particularly at the top of the each of the pages of the specification. Therefore, the examiner requests that Applicant carefully review the specification to fix all of the numerous instances where words appear to be missing a letter or letters. For instance, the following is but a few instances where the specification has words (mostly at the top of each page) missing a letter or letters.

The disclosure is objected to because of the following informalities:

- (1) page 2, line 1, change "strong r" to --stronger--, "th " to --the--, and "b st" to --best--;
- (2) page 2, line 18, change "wat r" to --water--;
- (3) page 3, line 1, change "pr pared" to --prepared--;
- (4) page 3, line 2, change "Th s " to --These-- and "s metimes" to --sometimes--;
- (5) page 3, line 5, change "themselv s" to --themselves--;
- (6) page 3, line 19, change "inj ct" to --inject--;
- (7) page 4, line 1, change "mad " to --made-- and "b " to --be--;
- (8) page 4, line 18, change "larg " to --large--;
- (9) page 5, line 1, change "de p" to --deep--;
- (10) page 5, line 2, change "tim " to --time--;
- (11) page 5, line 23, change "probl m" to --problem--;
- (12) page 6, line 1, change "th " to --the--;
- (13) page 6, line 3, change "sev re" to --severe--;

- (14) page 7, line 1, change "r quir ments" to --requirements--, "tol rat d" to --tolerated--, and "abs nce" to --absence--;
- (15) page 7, line 5, change "th " to --the--;
- (16) page 8, line 1, change "aug r" to --auger-- and "r quires" to --requires--;
- (17) page 9, line 1, change "p r" to --per--, "th " to --the--, "bind r" to --binder--, and "inj cted" to --injected--;
- (18) page 9, line 6, change "bind rs" to --binders--;
- (19) page 9, line 23, change "advantag s" to --advantages--;
- (20) page 10, line 5, change "wh n" to --when--;
- (21) page 11, line 13, change "th " to --the--;
- (22) page 11, line 24, delete "xxx";
- (23) page 12, line 1, change "D scription" to --Description-- and "th " to --the--;
- (24) page 13, line 1, change "structur " to --structure--, "Structur " to --Structure--, and "constitu ncy" to --constituency--;
- (25) page 13, line 2, change "provid " to --provide--;
- (26) page 14, line 15, change "zon " to --zone--;
- (27) page 15, line 1, change "availabl " to --available-- and "r act" to --react--;
- (28) page 16, line 1, change "th " to --the--;
- (29) page 17, line 1, change "h lically" to --helically--;
- (30) page 17, line 2, change "th " to --the--, "cont nt" to --content--, and "frequ ntly" to --frequently--;
- (31) page 19, line 19, change "ord r" to --order--;

(32) page 20, line 1, change "on " to --one--, "r versing th " to --reversing the--, and "whil " to --while--;

(33) page 21, line 1, change "s t" to --set--, "th " to --the--, and "th y" to --they--;

(34) page 22, line 1, change "van s th mselves" to --vanes themselves-- and "imm diate" to --immediate--;

(35) page 22, line 2, change "str am" to --stream-- and "bind r" to --binder--;

(36) page 22, line 7, change "th " to --the--;

(37) page 23, line 15, change "th " to --the--;

(38) page 24, line 1, change "th " to --the--;

(39) page 25, line 1, change "nozzl s" to --nozzles--;

(40) page 25, line 2, change "th " to --the--;

(41) page 27, line 1, change "passage " to --passage--, "deliv r" to --deliver--, and "ext nds" to --extends--;

(42) page 27, line 3, change "deliv rs" to --delivers--;

(43) page 29, line 1, change "b regard d" to --be regarded-- and "dilu nt" to --diluent--; and

(44) page 29, line 2, change "th " to --the--.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 20-24, 26, 27, and 29 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20, lines 17-18, the recitation of "discharging water or dry binder from a respective injector into said soil formation along a respective axis of emission of water or of said dry binder" is confusing and indefinite. This is particularly true in light of the later recitation at lines 21-23, (i.e., "so that the material of their emissions will during a limited number of revolutions of said shaft encounter one another") because only one material has been positively recited as being discharged in lines 17-18. Therefore, the examiner suggest amending lines 17-26 to read --simultaneously discharging said water from said water injector into said soil formation along an axis of emission of said water and discharging said dry binder from said binder injection into said soil formation along a axis of emission of said dry binder, both said axes of emission being directed away from said tool into said soil formation at a respective location along said central axis of said shaft, so that said water and said dry binder being emitted from said water injector and said binder injector, respectively, will during a limited number of revolutions of said shaft encounter one another to be mixed as a pre-determined ratio of said water and said dry binder, said water including water emitted from aid water injector and water which may have already been present at that depth in said soil formation--.



***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-3, 10, 20, 22, 23, 26, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Gunther (U.S. Patent No. 5,967,700).**

**As to claim 1, Gunther discloses a rotary tool (tractor-like vehicle 15) for drilling into a formation from its surface, controllably injecting water and dry binder at known depths below the surface of said formation, and mixing said soil, water and dry binder to form an in-situ piling, said tool comprising:**

**a rotary shaft (20) having a central axis of rotation adapted to be driven bi-directionally around said axis, and bi-directionally along said axis;**

**a vane (auger 30 with vane-like outer wall of arms 32 and 33; see col. 3, lines 41-43) on and extending radially from said shaft (20) to be rotated around and moved axially by said shaft (20), said vane (auger 30 with vane-like outer wall of arms 32 and 33; see col. 3, lines 41-43) being so disposed and arranged as to move through the formation along a path to drill into said formation, to stir the material of the formation, and ultimately to mix the material of the formation with water and dry binder;**

**a water injector (water passages 41 to orifices 43, 44, and 45 on the edge of each of the arms 32, 33, which is the leading edge when the auger 30 is penetrating the ground; see col. 3, lines 47-50) and a binder injector (a mixture of dry lime and dry**

cement is fed through orifices 60 formed in the wall of the drive shaft 20; see col. 4, lines 20-29) carried by said tool (15), each injector having a respective axis of emission of water or of dry binder, said axes of emission being directed away from said tool into said formation at a respective location along said central axis;

said injectors being so disposed and arranged relative to one another that the material of their emissions will during a limited number of revolutions of said shaft, encounter one another, there to be mixed as a pre-determined ratio of water and of dry binder, said water including water emitted from the water injector and water which may have already been present at that location.

**As to claim 2,** Gunther discloses the rotary tool (15) according to claim 1 as discussed above, and Gunther also discloses that said injectors are set in said shaft with their axes of emission substantially normal to said central axis (see Fig. 2, wherein water orifices 43, 44, and 45 all have axes normal to central axis and dry binder orifice 60 has axis normal to central axis), and located along said central axis such that the emission of one of them will, within a limited number or rotations of the shaft encounter and mix with the other in a temporally suitable time related to the curing of the binder and drainage of the water (see col. 2, lines 51-55).

**As to claim 3,** Gunther discloses the rotary tool according to claim 2 as discussed above, and Gunther also discloses that said injectors are disposed about 180 degrees apart as viewed in lateral section (see Fig. 3, wherein the soil orifice (in outer hatched annulus in middle of figure) is 180 degrees apart from the water orificies (43, 44, and 45) shown on the right-hand side of the figure).

**As to claim 10, Gunther discloses in combination:**

a rotary tool according to claim 1; and

a control valve (52, 65) respective to each of said injectors (water injectors 43, 44, and 45 and binder injector 60), whereby the rate of supply of water and of dry binder can independently be regulated by said control valves to provide binder at a rate desired at a respective depth and water at a rate desired which with existing water already in the formation at that depth, will constitute at least sufficient water for stoichiometric reaction of the binder (see col. 3, line 66 through col. 4, line 35).

**As to claim 20, Gunther discloses a method of forming an in-situ piling in a soil formation (12) with a dry binder and sufficient water to produce a stoichiometrically correct mixture, comprising:**

with a rotary tool (15) drilling into said formation (12; see Fig. 1), said tool (15) having a rotary shaft (20) that has a central axis of rotation and a vane (auger 30 has vane-like outer wall of arms 32 and 33; see col. 3, lines 41-43) for drilling into and mixing the soil (12), rotated around and moved axially by said shaft (20), said vane (auger 30 has vane-like outer wall of arms 32 and 33; see col. 3, lines 41-43) being so disposed and arranged as to move through the formation along a helical path to drill into said formation (12), to stir the material of the formation (12), and ultimately to mix the material of the formation (12) with water and binder;

a water injector (43, 44, 45) and a dry binder injector (60) carried by said tool (15);

driving said tool (15) axially into and out of said formation (12) while rotating it;

at some times during axial movement of said tool (15), discharging water or dry binder from a respective injector (43, 44, 45, or 60) into said soil formation (12) along a respective axis of emission of water or of said binder, said axes of emission being directed away from said tool (15) into said formation (12) at a respective location along said central axis (21), so that the material of their emissions will during a limited number of revolutions of said shaft (20) encounter one another, there to be mixed as a pre-determined ratio of water and of binder, said water including water emitted from the water injector and water which may have already been present at that depth.

**As to claim 22,** Gunther discloses the method of claim 20 as discussed above, and Gunther also discloses that injection of binder is made during passage of said tool out of said soil formation (see col. 4, lines 44-45).

**As to claim 23,** Gunther discloses the method of claim 20 as discussed above, and Gunther also discloses that injection of water is made during passage of said tool into said soil formation (see col. 4, lines 36-40).

**As to claim 26,** Gunther discloses the method of claim 20 as discussed above, and Gunther also discloses that the emission of one of said injectors is encountered in said soil formation in a temporally suitable time related to the curing of the binder and drainage of the water (see col. 2, lines 20-30).

**As to claim 29,** Gunther discloses the method of claim 20 as discussed above, and Gunther also discloses that the pressure of the stream of water and of the binder in the tool is above the ambient pressure which exists in the formation (see col. 4, lines 14-30; the mixture of dry lime and dry cement is injected under a pneumatic pressure or

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about 4,000 psi which is clearly greater than ambient pressure, and although it does not say what pressure the water is jetted out at, it would have to be a pressure greater than ambient or else the water would not jet out).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 11-13, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther (U.S. Patent No. 5,967,700), as applied to claims 1 and 20 above, and further in view of Hocking (U.S. Patent No. 5,944,446).**

As to claim 11, Gunther discloses the combination according to claim 10 as discussed above.

However, Gunther fails to explicitly disclose a program controls said control valves to establish the rates of supply of the binder and the water.

Hocking discloses an apparatus for injection of mixtures into subterranean formations comprising injection outlet ports (2) with radial isolation vanes (3) and flexible diaphragms (4) for independent control of injection pressures and flow rates in different directions. Hocking further discloses control valves (11), a computer providing feedback control (10) and pumping system (5). Injection pressures and flow rates are

interactively modified and thereby modify a mixture composition according to calculation and responses from detection devices (see abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the valve means of Gunther to incorporate programmable control, as taught by Hocking because Gunther clearly acknowledges that benefit of programmable controls for valve operation. Hocking's teaching further enhances the Gunther invention by providing programmable valve control for the ground improving injection fluid mixture, for more automation and convenience within the system.

**As to claim 12,** Gunther discloses the combination according to claim 11 as discussed above, and Gunther also discloses that said rates are related to already known water conditions and dry binder requirements at respective depths below said surface.

**As to claim 13,** Gunther discloses the combination according to claim 11 as discussed above.

However, Gunther fails to explicitly disclose that said rates are related to water conditions sensed at depths below said surface.

Hocking discloses an apparatus for injection of mixtures into subterranean formations comprising injection outlet ports (2) with radial isolation vanes (3) and flexible diaphragms (4) for independent control of injection pressures and flow rates in different directions. Hocking further discloses control valves (11), a computer providing feedback control (10) and pumping system (5). Injection pressures and flow rates are

interactively modified and thereby modify a mixture composition according to calculation and responses from detection devices (see abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention modify the disclosure of Gunther to incorporate detection devices, as taught by Hocking, because Gunther clearly acknowledges that benefit of soil testing at various depths, as disclosed above. Provision of devices to further detect and sense conditions below the surface are another method of determining water conditions for more accurately determining the binder/water ratio of the resulting binder composition to figure out and project the ultimate physical properties of the modified earthen mixture.

**As to claim 27, Gunther discloses the method of claim 20 as discussed above.**

However, Gunther fails to explicitly disclose that the emission of water is determined by a program responsive to data from a representative core.

Hocking discloses an apparatus for injection of mixtures into subterranean formations comprising injection outlet ports (2) with radial isolation vanes (3) and flexible diaphragms (4) for independent control of injection pressures and flow rates in different directions. Hocking further discloses control valves (11), a computer providing feedback control (10) and pumping system (5). Injection pressures and flow rates are interactively modified and thereby modify a mixture composition according to calculation and responses from detection devices (see abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the valve means of Gunther to incorporate programmable control, as taught by Hocking because Gunther clearly acknowledges that benefit of programmable

controls for valve operation. Hocking's teaching further enhances the Gunther invention by providing programmable valve control for the ground improving injection fluid mixture, for more automation and convenience within the system.

**As to claim 28,** Gunther discloses the method of claim 20 as discussed above.

However, Gunther fails to explicitly disclose that the emission of water is determined by a program responsive to data relating to water content already in the soil derived from a sensor on said tool disposed at an axial location below the place of injection of said binder.

Hocking discloses an apparatus for injection of mixtures into subterranean formations comprising injection outlet ports (2) with radial isolation vanes (3) and flexible diaphragms (4) for independent control of injection pressures and flow rates in different directions. Hocking further discloses control valves (11), a computer providing feedback control (10) and pumping system (5). Injection pressures and flow rates are interactively modified and thereby modify a mixture composition according to calculation and responses from detection devices (see abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the valve means of Gunther to incorporate programmable control, as taught by Hocking because Gunther clearly acknowledges that benefit of programmable controls for valve operation. Hocking's teaching further enhances the Gunther invention by providing programmable valve control for the ground improving injection fluid mixture, for more automation and convenience within the system.



Further, it would have been obvious to one of ordinary skill in the art at the time of the invention modify the disclosure of Gunther to incorporate detection devices, as taught by Hocking, because Gunther clearly acknowledges that benefit of soil testing at various depths, as disclosed above. Provision of devices to further detect and sense conditions below the surface are another method of determining water conditions for more accurately determining the binder/water ratio of the resulting binder composition to figure out and project the ultimate physical properties of the modified earthen mixture.

**Claims 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther (U.S. Patent No. 5,967,700), as applied to claim 20 above.**

**As to claims 21 and 24, Gunther discloses the method of claim 20 as discussed above.**

However, Gunther fails to explicitly disclose that injection of binder is made during passage of said tool into said soil formation, and that injection of water is made during passage of said tool out of said soil formation.

It is well settled that reversal of parts is a well known obvious expedient. See *In re Gazda*, 219 F.2d 449, 104 USPQ 400 (CCPA 1955), wherein prior art disclosed a clock fixed to the stationary steering wheel column of an automobile while the gear for winding the clock moves with steering wheel; mere reversal of such movement, so the clock moves with wheel, was held to be an obvious expedient.

Therefore, to have reversed the injection of binder from being done during passage of the tool out of the soil formation as taught by Gunther to being done during

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the passage of the tool into the soil formation, and to have reversed the injection of water from being done during passage of the tool into the soil formation as taught by Gunther to being done during the passage of the tool out of the soil formation, would have constituted an obvious expedient to one having ordinary skill in the art at the time the invention was made.

### ***Allowable Subject Matter***

Claims 8 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Response to Arguments***

Applicant's arguments filed 07 January 2005 have been fully considered but they are not persuasive.

Applicant argues that:

There is a fundamental difference between this invention and the inventions shown in the various cited references alone or in combination. It is that the process is neither "wet" nor "dry". The apparatus and process of this invention are not adapted to carry out either a wet or a dry procedure. Its concept is entirely different, both in process and in the product produced by the process.

...  
The instant invention is neither the wet nor the dry method. It eliminates the disadvantages of both of them and achieves better pilings than either one of them can. It is able to convey the binder to the nozzle dry, and can inject precisely the correct amount of binder for each depth and water condition. It can inject precisely the amount of water at each depth which added to the existing available water in the soil and the amount of binder will hydrate to react with the precise amount of binder.

An optimum piling can thereby be made. The running adjustments of water and binder are readily made by valves at the surface, to which emissions at the nozzle quickly respond.

However, to justify the advantages of this invention, it is necessary that the water and the cement arrive as liquid suspension (or mixture) in the bore where is to mix with the soil. Merely to inject binder some place at some time and water at some place and sometime, and hope to mix them, will not necessarily produce an optimum piling. They can, of course, be subsequently mixed, but the advantages of a similarly uniform mix are at least partially lost.

A particular advantage to attend to "timely" mixing of the water and binder in-situ is the tendency for water to drain after injection; especially in sand and sandy soil. If the binder is added much later than the water, the ratio of burden to cement might change. For this reason among others, it is advantageous for the two streams to merge and mix, or to be merged by mixing within a temporally suitable length of time.

These advantages are attained in this invention by injecting the water and binder through nozzles whose streams intersect to promptly after exiting the nozzles, or at close enough spaces that within a sufficiently close temporal time, they will promptly be mixed by a vane. Such arrangements are not shown or suggested by the references.

In addition, the claims have been amended to emphasize that the binder is a dry binder.

As amended, the claims recite apparatus and methods which are neither dry nor wet, but some sort of hybrid which makes markedly improved pilings.

All of the claims have been rejected either on Gunther or on Gunther continued with another reference or references. Gunther '700 is applicant's first effort to make a consistent piling. Essentially he injects water and mixes it into the soil. Then he injects dry binder into the wet soil. The places of injection are spaced from one another. The binder is injected radially from the center shaft, and the water from the vanes. There is no closely-related injection of both, either spatially or are not related temporally. The streams themselves are not related.

The claims have been amended to emphasize that the binder is delivered dry, and that the streams are temporally or spatially related so as to mix properly. In the preferred embodiment the streams intersect and continue radially as a combined mixture or suspension. This feature, using dry binder is not shown or suggested by Gunther or any reference or combination of references with Gunther.

It is submitted that the distinction of use of dry binder, injected in a temporal or spatial relationship as now recited, removes Gunther as a primary reference, and thereby from all of the rejections.

Similarly, Yoshida relates specifically to the wet method. He injects "cement milk", meaning a slurry, and cannot provide the advantages of this invention. He add [sic] nothing to the Gunther reference.

Hockey [sic] discloses control systems but not for the precise process. To the extent that controlled systems, are rejected, it is submitted that these limitations are merely in addition to claims otherwise allowable.

As to Blum, it is commented that while he requires enough pressure on grout to get it into the soil, again it is in a liquid system. Nothing is said or suggested about keeping a nozzle clear of liquid so as to forestall curing of grout in the system. Blum is not pertinent to this invention.

It is believed that the above discussion should serve to respond to the rejections of the individual claims. A claim-by-claim discussion would it is submitted be unnecessary. The field of use limitation in itself is believed to be sufficient distinction over the cited art.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., (1) the running adjustments of water and binder are readily made by valves at the surface, to which emissions at the nozzle quickly respond; (2) that the water and the cement arrive as liquid suspension (or mixture) in the bore where is to mix with the soil; (3) advantageous for the two streams to merge and mix, or to be merged by mixing within a temporally suitable length of time; (4) by injecting the water and binder through nozzles whose streams intersect to promptly after exiting the nozzles, or at close enough spaces that within a sufficiently close temporal time, they will promptly be mixed by a vane; (5) that the streams are temporally or spatially related so as to mix properly; and (6) the streams intersect and continue radially as a combined mixture or suspension) are not recited in the independent claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The examiner disagrees that the feature of using dry binder is not shown or suggested by Gunther. Indeed, at col. 4, lines 20-30, Gunther clearly states that a “dry” mixture of lime and cement is injected into the stirred and moistened soil. Further, the above-listed features (1)-(6) are not recited in independent apparatus claim 1 or independent method claim 20.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gay Ann Spahn whose telephone number is (571)-272-7731. The examiner can normally be reached on Monday through Thursday, 8:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Heather C. Shackelford can be reached on (571)-272-7049. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gay Ann Spahn, Patent Examiner  
November 9, 2005

A handwritten signature in black ink, appearing to read 'M. Safavi', with a stylized, flowing script.

**MICHAEL SAFAVI  
PRIMARY EXAMINER  
ART UNIT 354**